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Edible product

Field of Invention

The present invention concerns edible products with improved taste and methods to improve the taste of such products. The edible products with improved taste do not have unwanted or too strong e.g. bitter or sour taste. They are preferably also healthier due to the added ingredient.

Background of the Invention

Many food products and beverages have unpleasant, undesired taste, which is often mainly related to excess bitterness or sourness. Because the taste of the product plays an essential role when determining the final acceptance by the consumer, efforts have been made to mask or diminish the unpleasant taste. Some examples of products that have unpleasant, bitter or sour taste are e.g. beverages, such as fruit and vegetable juices, coffee, tea, cocoa and chocolate products, soy products and cereal products, especially soy and cereal based drinks, fermented products, such as yoghurts and fermented soy products. The unpleasant taste is often more pronounced in low viscosity products than in products having higher viscosity. The products mentioned above are currently consumed in increasing amounts.

Various methods have been used to mask the unpleasant taste. A commonly used method is to mask the unpleasant taste by enhancing the sweetness of the product. This is usually achieved by adding extra sugar or other sweetening agents. In most cases, this imparts additional calories into the products and truly low caloric products cannot be formulated by using this approach. Although low-calorie or non-calorie sweeteners bring only few or not at all extra calories to the product, some of them, e.g. saccharin and Acesulfame-K have bitter off-taste themselves. In addition, there are many regulatory restrictions in usage of above mentioned sweeteners, e.g. their use is allowed only in a limited range of products and in limited amounts. Also the safety of some of these products is still under debate, and for example consumption of aspartame should be avoided by phenylketonuric individuals.

The sugar most often used to mask undesired tastes is sucrose. Also fructose and fructose syrups are very common and often preferred because of their stronger relative sweetness compared to sucrose. In the past, fructose was considered to be a better choice than sucrose, glucose or complex carbohydrates, especially for people having

diabetes mellitus, because fructose digestion results in smaller postprandial glycemic and insulin excursions than glucose and complex carbohydrates. However, more recently fructose has been found to be a contributor to many diseases, such as manifestations of the insulin resistance syndrome. Fructose consumption induces insulin resistance, impaired glucose tolerance, hyperinsulinemia, hypertension and hyperlipidemia, i.e. risk factors for cardiovascular disease. Consumption of fructose is also likely to lead to increased energy intake, weight gain and obesity. Thus added fructose, in the form of sucrose or fructose syrups, is not recommended. Especially people with insulin resistance or hyperlipidemia should not choose products sweetened with fructose or sucrose, which is composed of 50 % fructose. (Elliot S.S. et al., Am. J. Clin. Nutr. 76 (2002) 911). Sugar alcohols have also been used as sweetening agent, but their sweetness, and ability to mask undesired tastes, is poor compared to fructose or sucrose based ingredients.

In addition to sugar and other sweetening agents, also other components have been used to mask or reduce the unpleasant taste, e.g. different kind of aromas and also certain lipid compounds or compositions containing lipids. Especially triglycerides, with high content of saturated fatty acids, are known to be effective in masking undesired taste in food products. However, triglycerides can have a negative effect on the nutritional characteristics of the product. Lipids also impart extra calories to the product.

WO 01/54686 describes how the bitter taste of L-arginine is reduced by encapsulating arginine with phytosterols. The bitter tasting component, L-arginine, is mixed with the coating material (phytosterols) in a solvent system, such as hexane and ethanol. Then the mixture is dried, e.g. spray dried, to obtain phytosterol-coated L-arginine. The bitter, fishy unpleasant taste of L-arginine is diminished by this technique.

Although encapsulation and coating techniques are effective in reducing the bitter or otherwise unpleasant taste, one of their disadvantages is the need for extra processing, e.g. drying. This makes them both unsuitable for certain type of products and expensive.

It is known that increasing the viscosity of the product decreases the intensity of bitter and/or sour taste. However, many products are preferred to be consumed in a liquid or low-viscosity form. There are not good methods for producing low-viscosity, low-sugar and low-fat products where bitter and/or sour tastes are well masked.

There is a growing need for healthy products with good taste and high nutritional value.

Low-fat products with reduced unpleasant or too strong tastes, such as bitterness or sourness, without increased sugar and/or calorie content are needed. Especially products with low viscosity, such as beverages, with these characteristics would be desirable. The present invention provides products meeting these requirements.

Summary of the Invention

The present invention provides edible products with improved taste. It is also possible to improve the nutritional properties of the products by using this invention. The invention is directed to edible products with improved taste. The invention is directed in particular to edible products with reduced bitterness, sourness and/or astringent taste, due to an added ingredient, plant sterol ester. The invention is also particularly directed to edible products with reduced bitterness, sourness and/or astringent taste together with lowered content of sugar or other sweetening agents.

It was found that plant sterol ester is capable of reducing the bitter, sour and/or astringent tastes that normally occur in many edible products. Examples of this kind of products include, but are not restricted to, soy and legume based products, cereal products, especially soy and cereal based drinks, fruit and vegetable products, beverages, such as fruit and vegetable juices, coffee, tea, cocoa and chocolate products and fermented products, such as yoghurts and fermented soy products. The benefits of the present invention are especially pronounced in low viscosity products. Particular edible products according to the invention are characterised by what is stated in the characterising part of the independent product claims.

The present invention also provides a method for improving the taste of edible products by using plant sterol ester in the product. The method for improving the taste of the edible products according to the invention is characterised by what is stated in the characterising part of the independent method claim.

A preferred embodiment of the present invention is that it provides edible products with improved taste and reduced amount of added sugar or other sweetening ingredients. These products usually have lower calorie content than the regular products where the unpleasant taste has been masked with extra sugar.

It is known that plant sterol ester has serum cholesterol level lowering effects. In a preferred embodiment additional benefits of the edible product with improved taste include also health benefits, i.e. serum total and/or LDL cholesterol lowering effects.

Definitions

As used here, "edible product" comprises all food products, nutraceuticals and pharmaceuticals that contain bitter, sour and/or astringent tastes. Some of these tastes may be regarded unpleasant in certain products. The food products are a preferred embodiment of the invention.

The food products comprise e.g soy based products, cereal or grain based products, fermented products, citrus or other fruit based products, berry products, vegetable products, coffee, tea or cocoa based products, soups, drinks, meal replacement products and/or any combination of them. Typical examples of these food products include soy or cereal based drinks, desserts, ice creams or yoghurts. Also different kind of fruit and vegetable juices, jams or thickened juices are typical examples of the food products The invention is especially directed to all food products containing bitter, sour and/or astringent taste.

As used here the term "sweetening agent" includes compounds used to increase the sweetness of the product. Sweetening agents include sugars, other carbohydrate sweeteners and non-carbohydrate sweeteners. As used here the term "sugar" refers to sucrose and the constituents of sucrose i.e. glucose and/or fructose, sugar syrup, malt syrup, maple syrup, starch syrup, glucose syrup, high-fructose corn syrup, honey, molasses, and other carbohydrates that can be used as sweetening agents or a source of these. The term "other carbohydrate sweetener" refers to e.g. sugar alcohols, such as xylitol, maltitol, lactitol and sorbitol. Suitable examples of the non-carbohydrate sweeteners include e.g. aspartame, asesulfame-K, saccharin, cyclamates and sucralose.

As used here, the term "plant sterol ester" refers to plant sterols having at least 60%, preferably at least 85%, most preferably at least 95% of the plant sterols in esterified form.

In this invention the plant sterols are esterified with an organic acid and it is here called "plant sterol ester". Examples of suitable organic acids are fatty acids (2–24 carbon atoms, saturated, monounsaturated or polyunsaturated, including also special fatty acids, such as conjugated fatty acids, e.g. CLA, and EPA and DHA), hydroxybenzoic acids, hydroxycinnamic acids (ferrulic and coumaric acids), di- and tricarboxylic acids and hydroxy acids, and any mixture of said acids. Preferably the plant sterols are esterified with fatty acids, most preferably with vegetable oil based fatty acids.

As used here, the term "plant sterol" include both sterols and saturated sterols, i.e. stanols. In this specification the sterols include 4-desmethyl sterols, 4-monomethyl sterols and 4,4-dimethyl sterols (triterpene alcohols) and the stanols include 4-desmethyl stanols, 4 monomethyl stanols and 4,4-dimethyl stanols. Typical 4-desmethyl sterols are sitosterol, campesterol, stigmasterol, brassicasterol, 22-dehydrobrassicasterol and Δ5-avenasterol. Typical 4,4-dimethyl sterols are cycloartenol, 24-methylenecycloartenol and cyclobranol. Typical stanols are sitostanol, campestanol and their 24-epimers, cycloartanol and saturated forms obtained by saturation of e.g. triterpene alcohols (cycloartenol, 24-methylenecycloartenol and cyclobranol). The term "plant sterol" includes all possible mixtures of named sterols and/or stanols as well as any individual sterol or stanol.

Stanol fatty acid ester and the effects thereof, as well as a suitable method for its preparation, are disclosed in US Patent No. 6,174,560.

Detailed Description of the Invention

The various features and benefits of the present invention will be described in greater detail in the following and in the examples. All percentages referred to in this specification are given as weight-%.

It has now surprisingly been noticed that adding plant sterol ester improved the taste of certain edible products. Moreover, the sweetening agent content of the final product can be reduced since plant sterol ester masks the bitter, sour and/or astringent tastes of the product and high amount of sweetening agent is not needed to improve the acceptance.

The primary object of the present invention is thus certain edible products with improved taste, wherein the product comprise plant sterol ester in an amount from 0.2 to 25 weight-%.

Preferably the plant sterol ester is a plant sterol fatty acid ester. The fatty acid ester is technically very suitable for incorporation into different food products. Preferably the plant sterol in the plant sterol ester is a stanol because its absorption is negligible and the use of stanol is therefore safer. In addition, the physical properties of stanol are more suitable for this purpose, because the stanol is saturated. Most preferred is therefore the plant stanol fatty acid ester for use in food products according to the invention.

The level of plant sterol ester in the edible product is from 0.2 to 25 weight-%, preferably 0.5 15 weight- % and more preferably 1.0–10 weight-%.

According to this invention, 5% to 99%, preferably 10% to 75%, more preferably 10% to 50% and most preferably 15% to 30% of the sweetening agent content of the edible product is reduced.

A preferred embodiment of this invention is improving the taste in low-viscosity edible products. The viscosity (Brookfield viscometer, measured at the temperature of conventional use of the product in question) of the edible product according to this invention is preferably 0.001 Pas to 2.0 Pas, more preferably 0.002 Pas to 1.5 Pas, still more preferably 0.002 Pas to 1.0 Pas, even more preferably 0.002 to 0.5 Pas and most preferably 0.004 Pas to 0.5 Pas.

By the use of the added ingredient, plant sterol ester, it is possible to improve the nutritional properties of the edible product. Preferably the plant sterols are esterified with fatty acids, most preferably fatty acids derived from vegetable oils with high content of monounsaturated or polyunsaturated fatty acids. Thus it is also possible to improve the fatty acid profile of the edible product compared to the regular products. A preferred embodiment of the invention is that when a part of triglyceride fat is replaced with plant sterol ester, it is possible to improve or retain the fatty acid composition of the edible product. This means that the amount of saturated fat does not necessarily increase due to the added ingredient.

In addition, it is possible to reduce the amount of absorbable fat in the final edible product if sterol ester replace triglyceride fat in the product. Moreover it is possible to achieve lower absorbable fat content as compared to the similar product where any of the triglyceride fat is not replaced with plant sterol ester. The reason for this is that the sterol part of the plant sterol fatty acid ester is virtually unabsorbable and does no increase the energy or absorbable fat content of the edible product.

A preferred embodiment of the invention is that the products according to the invention are also healthier since they are suitable for reducing serum total and/or LDL cholesterol levels.

A preferred embodiment of the invention is that by using plant sterol ester in the product, it is possible to achieve lower energy content because the amount of fat and/or sweetening agent can be reduced without increasing the strength of bitter, sour and/or astringent tastes.

A preferred embodiment of the invention is that better texture and mouthfeel characteristics can be obtained in many applications by using the method of the present invention compared to adding sugar or other sweetening agents.

A preferred embodiment of the invention is masking the bitter taste of certain food products. Preferably the food products according the invention include soy based products, cereal or grain based products, fermented products, citrus or other fruit based products, berry products, vegetable products, coffee, tea or cocoa based products, soups, drinks and meal replacement products and any combination or source of them. Typical examples of these food products include coffee, cocoa, tea and soy and cereal based drinks. Also different kinds of fruit and vegetable juices, jams and thickened juices are typical examples of the food products.

A preferred embodiment of the invention is masking the sour taste of certain food products. Preferably the food products according the invention include soy based products, cereal or grain based products, fermented products, citrus or other fruit based products, berry products, vegetable products, soups, drinks and meal replacement products and any combination or source of them. Typical examples of these food products include soy or cereal based drinks, desserts, ice creams and yoghurts. Also different kinds of fruit and vegetable juices, jams and thickened juices are typical examples of the food products.

A preferred embodiment of the invention is masking the taste of certain nutraceuticals and/or pharmaceuticals. Preferably the nutraceuticals and/or pharmaceuticals include drinkable and low-viscosity products. A typical example of a pharmaceutical according to the invention is a liquid cough mixture, and an example on a nutraceutical is a liquid plant extract.

Another preferred embodiment of the invention is a cereal milk based drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.5-8.0 weight %, preferably 0.6-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a milk based cocoa drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.2-8.0 weight-%, preferably 0.2-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a milk based coffee drink comprising 0.2-7.0 weight-%, preferably 0.2-5.0 weight-%, more preferably 0.5-2.0 weight-% plant sterol ester and 0.1-6.5 weight-%, preferably 0.5-5.5 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a soy milk based drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.1-2.3 weight-%, preferably 0.2-2.0, more preferably 0.3-1.2 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a soy based fruit and/or flavoured drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.1-9.0 weight-%, preferably 0.2-7.0 weight-%, more preferably 0.5-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a soy based coffee or cocoa drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-%, more preferably 0.5-2.5 weight-% plant sterol ester and 0.1-5.5 weight-%, preferably 0.5-4.5 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a whey based drink comprising 0.2-7.0 weight-%, preferably 0.2-5.0 weight-%, more preferably 0.5-3.0 weight-% plant sterol ester and 0.5-7.0 weight-%, preferably 1.0-6.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a berry based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.5-19 weight-%, preferably 1.0-10 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a fruit juice based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.3-7.5 weight-%, preferably 0.3-5.0 weight-% sucrose.

Another preferred embodiment of the invention is a fruit juice based drink comprising at least 50 weight-%, preferably at least 75 weight-% citrus fruit juice calculated on the amount of total fruit juice in the product, 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.2-7.5 weight-%, preferably 0.3-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a fruit juice based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.00005- 0.03 weight-%, preferably 0.0001-0.02 weight-% non-carbohydrate sweetening agent.

Another preferred embodiment of the invention is a fermented milk product, such as yoghurt or yoghurt drink, comprising 0.2-8.0 weight-%, preferably 0.3-6.0 weight-% plant sterol ester and 0.5-6.0 weight-%, preferably 0.5-5.0 weight-%, most preferably 0.5-4.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a cereal-based yoghurt-like product comprising 0.2-12 weight-%, preferably 0.5-7.0 weight-% plant sterol ester and 0.5-9.5 weight-%, preferably 1.0-8.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a soy based yoghurt-like product comprising 0.2-12 weight-%, preferably 0.5-7.0 weight-% plant sterol ester and 0.5-9.0 weight-%, preferably 1.0-8.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is an ice cream-like product comprising 0.2-18 weight-%, preferably 0.5-12 weight-% plant sterol ester and 0.5-7.0 weight-%, preferably 0.5-6.0 weight-%, more preferably 0.8-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

Another preferred embodiment of the invention is a liquid meal replacement product comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.5-6.5 weight-%, preferably 0.5-6.0 weight-%, more preferably 0.8-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

Still another preferred embodiment of the invention is a tea based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.5-17 weight-%, preferably 1.3-12 weight-%, most preferably 2.0-8.0 weight-% sucrose.

Still another object of the invention is a method for improving the taste of edible products by using plant sterol ester in the edible product. Plant sterol ester is used in an amount of 0.2 to 25 weight-% in the preparation of the products. The plant sterol ester is incorporated into the edible product in any convenient way without separately preparing a coating on the bitter, sour and/or astringent components of the product. The plant sterol ester is incorporated into the edible product as a part of the conventional processes used for producing the edible products, preferably is added by using any known techniques for adding triglycerides into the edible products. Neither does the method include using solvents or additional drying steps because of the added plant sterol ester.

The edible product of the present invention may also comprise optional ingredients such as stabilizers, emulsifiers, colouring agents and nutrients (e.g. vitamins and/or minerals).

The following examples are presented only to further illustrate the invention and are not intended to limit the scope of the invention, which is defined by the claims.

Example 1

Sensory evaluation

It is well known that some triglycerides are added to certain food products to improve the taste. However, increased amount of absorbable fat, especially saturated fatty acids is an unwanted property when nutritional point of view is considered.

The aim of the sensory evaluation test was to compare the efficiency of plant sterol ester and vegetable oil in masking the intensity of bitter taste. The test was done by using a trained taste panel that has a long experience in sensory evaluation of food products. As plant sterol ester, plant stanol fatty acid ester and as the vegetable oil, rapeseed oil were used.

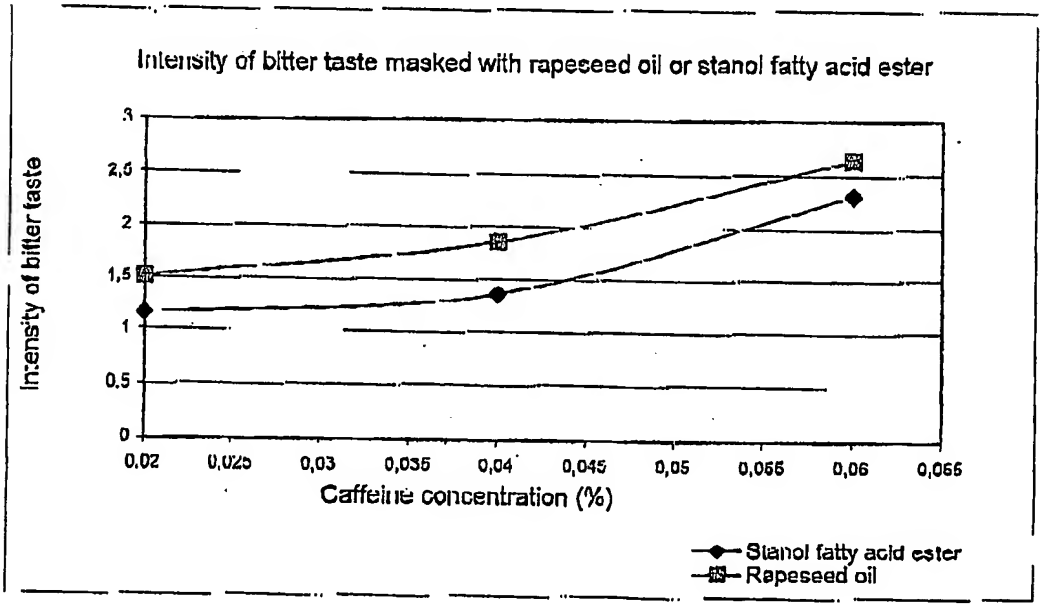
The effects were studied by using following matrixes:

- Matrix I — Rapeseed oil (8 %), Guar gum (0.7 %)
- Matrix II — Stanol fatty acid ester (8 %), Guar gum (0.7 %)

Samples were made from above mentioned matrixes with the following different amounts of caffeine: 0.02 %; 0.04 %; 0.06 %. Reference sample contained 0 % of caffeine. Water was added up to 100 % and the components were mixed at 60 °C and homogenised.

Sensory evaluation was performed as a multiple comparing test. In this test the subject compared actual samples to the reference sample which did not contain any caffeine. The temperature of the samples was 50 °C when they were evaluated. 15 subjects evaluated the intensity of bitter taste as compared to the reference sample. The scale used in this study was from 0 to 3 (0 = no difference, 1– weak difference, 2 – clear difference, 3 – strong difference). The results are given as mean values

The results show that plant stanol fatty acid ester decreased the bitter taste of the product as compared to the control sample containing the same amount of rapeseed oil.



In this sensory evaluation it was surprisingly noticed that plant stanol ester was more effective in masking the bitter taste than vegetable oil.

Example 2

Sensory evaluation

It is well known that sugar is added to certain food products to mask bitter tastes. However, increased amount of sugar is an unwanted property when nutritional point of view is considered.

The aim of the sensory evaluation test was to study the efficiency of plant sterol ester in masking the intensity of bitter taste as compared to the effect that can be achieved with sugar. The test was done by using a trained taste panel that has a long experience in sensory evaluation of food products.

The effects were studied by using the following samples:

- Sample I: Soy milk (92.1 %), Sucrose (7.8 %), Caffeine (0.06 %)
- Sample II: Soy milk (89.3 %), Sucrose (6.6 %), Stanol fatty acid ester (4.0 %), Caffeine (0.06 %)
- Sample III: Soy milk (90.4 %), Sucrose (5.5 %), Stanol fatty acid ester (4.0%), Caffeine (0.06 %)

The samples were made with suitable equipment by using heating and homogenisation. Sensory evaluation was performed as a two-tailed paired test. In this test the subjects compared samples II and III to the reference sample (I). 14 subjects evaluated the intensity of bitter taste as compared to the reference sample and answered to the following questions:

a) Which one of the samples, I or II, is more bitter?

b) Which one of the samples, I or III, is more bitter?

The subjects did not detect any difference between the bitter taste of sample I and sample II; neither between sample I and sample III.

In this sensory evaluation we showed that it is possible to reduce the amount of sucrose up to 30 % when plant stanol ester is added into the product. The sensory evaluation group was not able to detect the difference between the products where bitter taste was masked with sucrose or where it was masked with plant stanol ester.

Example 3
Sensory evaluation

It is well known that sugar is added to certain food products to mask sour tastes. However, an increased amount of sugar is an unwanted property when considering nutritional values.

The aim of the sensory evaluation test was to study the efficiency of plant sterol ester in masking the intensity of sour taste as compared to the effect that can be achieved with sugar. The test was done by using a trained taste panel that has a long experience in sensory evaluation of food products.

The effects were studied by using following matrixes:

- Sample I
  Water (90.2 %)
  Pectin (1.5 %)
  Sucrose (8.0 %)
  Citric acid (0.3 %)

- Sample II
  Water (87.6 %)
  Pectin (1.5 %)
  Sucrose (6.6 %)
  Stanol fatty acid ester (4.0 %)
  Citric acid (0.3 %)

- Sample III
  Water (88.6 %)
  Pectin (1.5 %)
  Sucrose (5.6 %)
  Stanol fatty acid ester (4.0 %)
  Citric acid (0.3 %)

The samples were made with suitable equipment by using heating and homogenisation. Sensory evaluation was performed as a two-tailed paired test. In this test the subjects compared samples II and III to the reference sample I. 15 subjects evaluated the intensity of sour taste as compared to the reference sample and answered to the following questions:

a) Which one of the samples, I or II, is more sour?

b) Which one of the samples, I or III, is more sour?

The subjects did not detect any difference between the sour taste of sample I and II; neither between sample I and III.

In this sensory evaluation we showed that it is possible to reduce the amount of sucrose up to 30 % when plant stanol ester is added into the product. The sensory evaluation group was not able to detect the difference between the products where sour taste was masked with sucrose or where it was masked with plant stanol ester.

Examples 4-17 illustrate food products where the amount of sweetening agent(s) could be reduced due to an added ingredient according to the present invention.

Example 4

Soy milk drink

Fat free soy milk	93.3 %
Plant stanol fatty acid ester	5.0 %
Sucrose	1.7 %

The soy milk drink contained 30 % less sucrose than a regular product.

Example 5

Soy based fruit drink

Water	82.1 %
Plant stanol fatty acid ester	3.0 %
Concentrated fruit juice, unsweetened	6.0 %
High fructose corn syrup	7.0 %
Soy protein isolate	1.8 %
Emulsifiers	0.1 %

The flavoured soy based drink contained 26 % less sugar than a regular product.

Example 6

Soy based coffee drink

Fat free soy milk	90.5 %
Sucrose	5.0 %

Instant coffee	2.0 %
Plant stanol fatty acid ester	2.5 %

The soy milk coffee contained 16 % less sucrose than a regular product.

Example 7

Cocoa drink

Milk	91.9 %
Sucrose	2.5 %
Plant sterol fatty acid ester	3.0 %
Cocoa	2.5 %
Emulsifiers	0.1 %

The cocoa drink contained 50-75 % less sucrose than a regular product. The ratio of sucrose and cocoa in a regular cocoa drink is from about 2:1 to about 4:1. In the cocoa drink containing plant stanol fatty acid ester the sucrose:cocoa ratio was 1:1 and the amount of sucrose could be decreased by 50 % compared to the regular products having the lowest sugar content.

Example 8

Grapefruit juice

Grapefruit juice	98.3 %
Plant stanol fatty acid ester	1.0 %
Pectin	0.7 %
Aspartame	0.02 %

The grapefruit juice contained 37 % less aspartame than a regular grapefruit juice sweetened with aspartame.

Example 9

Cranberry juice

Cranberry juice	82.5 %
Sucrose	15.0 %
Plant stanol fatty acid ester	1.8 %
Pectin	0.7 %

The cranberry juice contained 25 % less sucrose than a regular cranberry juice.

Example 10

Orange juice

Orange juice	96.0 %
Plant stanol fatty acid ester	1.8 %
Emulsifier	0.1 %
Stabilizer	0.1 %
Sucrose	2.0 %

The orange juice contained 50 % less sucrose than a regular orange juice sweetened with sucrose.

Example 11

Yoghurt drink

Pasteurized milk	86.8 %
Sucrose	6.0 %
Plant stanol fatty acid ester	1.0 %
Fruit/berry juice concentrate (unsweetened)	6.0 %
Stabilizers	0.2 %
Sodium citrate	

The yoghurt drink was prepared by conventional yoghurt drink preparation methods and fermented with *Bifidobacteria* culture. The amount of sweetening agent (sucrose) was reduced by 20 % in the yoghurt drink containing plant stanol fatty acid ester compared to a regular product sweetened with sucrose.

Example 12

Yoghurt-like product

Soy milk	75.5 %
Strawberry jam	20.0 % (containing 35 % sucrose)
Plant sterol fatty acid ester	4.0 %
Pectin	0.5 %

The yoghurt was prepared by conventional soy yoghurt preparation methods and fermented with *Bifidobacteria* culture. The strawberry jam, and thus the yoghurt produced by using it, contained 26 % less sucrose than a regular product.

Example 13

Yoghurt-like product

Oat milk	74.0 %
Strawberry jam	20.0 % (containing 37 % sucrose)
Plant stanol fatty acid ester	3.0 %
Oat bran	2.5 %
Pectin	0.5 %

The yoghurt was prepared by conventional yoghurt preparation methods and fermented with *Bifidobacierta* culture. The strawberry jam, and thus the oat milk yoghurt produced by using it, contained 26 % less sucrose than a regular product.

Example 14

Ice cream-like product

Soy bean water extract	81.3 %
Sucrose	6.0 %
Plant stanol fatty acid ester	12.0 %
Vanilla flavor	0.2 %
Stabilizers (carrageen, guar gum, xanthan gum)	0.5 %

The ice cream-like product contained 25 % less sucrose than a regular product.

Example 15

Liquid meal replacement product

Liquid meal replacement in a form of a ready to drink shake was prepared of the following ingredients: soy milk, fruit juice (orange, banana, strawberry), plant sterol fatty acid ester (4 %), sucrose (5 %), vitamins and minerals. The amount of sucrose was 28 % lower than in a regular meal replacement product due to the added ingredient according to the present invention.

Example 16

Liquid meal replacement cocoa drink

Water	83.5 %
Cocoa	2.0 %
Soy protein	6.0 %
Plant stanol fatty acid ester	2.5 %
Guar Gum	2.0 %
Sucrose	4.0 %

The liquid meal replacement cocoa drink contained 50% less sucrose than a regular product.

Example 17

Whey based drink

Whey	84.7 %
Sugar syrup	6.0 %
Plant sterol fatty acid ester	1.2 %
Fruit/berry juice concentrate (unsweetened)	8 %
Carrageen	0.1 %
Sodium citrate	

The amount of sucrose was reduced by 20 % in the whey based drink containing plant sterol fatty acid ester compared to a regular product.

Example 18

Yoghurt

Pasteurized milk	85.2 %
Sucrose	5.5 %
Plant stanol fatty acid ester	1.0 %
Strawberry preparation (unsweetened)	8 %
Stabilizers	0.2 %
Sodium citrate	
Color (anthocyanins)	

The yoghurt was prepared by conventional yoghurt preparation methods and fermented with *Bifidobacteria* culture. The amount of sucrose was reduced by 15 % in the yoghurt containing plant stanol fatty acid ester compared to a regular product sweetened with sucrose.

Example 19

Milk based coffee drink

Milk (1.5 % fat)	89.1 %
Sucrose	6.0 %
Instant coffee	3.0 %
Plant stanol fatty acid ester	1.8 %
Emulsifier	0.1 %
Tricalcium citrate	0.015 %

The milk coffee contained 12 % less sucrose than a regular product.

Example 20

Tea drink

Tea based drink	88.8 %
Plant stanol fatty acid ester	1.0 %
Emulsifier	0.1 %
Stabilizer	0.1 %
Sucrose	10.0 %

The tea drink contained 44 % less sucrose than a regular tea based drink sweetened with sucrose.

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Claims

1. An edible product with improved taste, wherein the product comprises from 0.2 to 25 weight-%, preferably from 0.5 to 15 weight-%, more preferably from 1.0 to 10 weight-% plant sterol ester and the improved taste comprises masking of the bitter, sour and/or astringent taste.

2. The product according to claim 1, wherein the amount of sweetening agent in the product is reduced.

3. An edible product comprising sweetening agent, wherein the product contains from 0.2 to 25 weight-%, preferably from 0.5 to 15 weight-%, more preferably from 1.0 to 10 weight-% plant sterol ester and the amount of sweetening agent is reduced.

4. The product according to any one of claims 1 to 3, wherein the amount of sweetening agent is reduced by 5 to 99 weight-%, preferably by 10 to 75 weight %, more preferably by 10 to 50 weight-%, and most preferably by 15 to 30 weight-%.

5. The product according to any one of claims 1 to 4, wherein the plant sterol ester is stanol fatty acid ester.

6. The product according to any one of claims 1 to 5, wherein the viscosity of the product is 0.001 to 2.0 Pas, preferably 0.002 to 1.5 Pas, more preferably 0.002 to 1.0 Pas, still more preferably 0.002 to 0.5 Pas and most preferably 0.004 to 0.3 Pas.

7. A cereal milk based drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.5-8.0 weight-%, preferably 0.6-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

8. A milk based cocoa drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.2-8.0 weight-%, preferably 0.2-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

9. A milk based coffee drink comprising 0.2-7.0 weight-%, preferably 0.2-5.0 weight-%, more preferably 0.5-2.0 weight-% plant sterol ester and 0.1-6.5 weight-%, preferably 0.5-5.5 weight-% sugar and/or other carbohydrate sweetening agent.

10. A soy milk based drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.1-2.3 weight-%, preferably 0.2-2.0, more preferably 0.3-1.2 weight-% sugar and/or other carbohydrate sweetening agent.

11. A soy based fruit and/or flavoured drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.1-9.0 weight %, preferably 0.2-7.0 weight-%, more preferably 0.5-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

12. A soy based coffee or cocoa drink comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-%, more preferably 0.5-2.5 weight-% plant sterol ester and 0.1-5.5 weight-%, preferably 0.5-4.5 weight-% sugar and/or other carbohydrate sweetening agent.

13. A whey based drink comprising 0.2-7.0 weight-%, preferably 0.2-5.0 weight-%, more preferably 0.5-3.0 weight-% plant sterol ester and 0.5-7.0 weight-%, preferably 1.0-6.0 weight-% sugar and/or other carbohydrate sweetening agent.

14. A berry based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.5-19 weight %, preferably 1.0-10 weight-% sugar and/or other carbohydrate sweetening agent.

15. A fruit juice based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.3-7.5 weight-%, preferably 0.3-5.0 weight-% sucrose.

16. A fruit juice based drink comprising at least 50 weight-%, preferably at least 75 weight-% citrus fruit juice calculated on the amount of total fruit juice in the product, 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.2-7.5 weight-%, preferably 0.3-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

17. A fruit juice based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.00005- 0.03 weight-%, preferably 0.0001-0.02 weight-% non-carbohydrate sweetening agent.

18. A fermented milk product, such as yoghurt or yoghurt drink, comprising 0.2-8.0 weight-%, preferably 0.3-6.0 weight-% plant sterol ester and 0.5-6.0 weight-%, preferably 0.5 5.0 weight-%, most preferably 0.5-4.0 weight-% sugar and/or other carbohydrate sweetening agent.

19. A cereal-based yoghurt-like product comprising 0.2-12 weight-%, preferably 0.5-7.0 weight-% plant sterol ester and 0.5-9.5 weight-%, preferably 1.0-8.0 weight % sugar and/or other carbohydrate sweetening agent.

20. A soy based yoghurt-like product comprising 0.2-12 weight-%, preferably 0.5-7.0 weight-% plant sterol ester and 0.5-9.0 weight-%, preferably 1.0-8.0 weight-% sugar and/or other carbohydrate sweetening agent.

21. An ice cream-like product comprising 0.2-18 weight-%, preferably 0.5-12 weight-% plant sterol ester and 0.5-7.0 weight-%, preferably 0.5-6.0 weight-%, more preferably 0.8-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

22. Liquid meal replacement product comprising 0.2-10 weight-%, preferably 0.5-5.0 weight-% plant sterol ester and 0.5-6.5 weight-%, preferably 0.5-6.0 weight-%, more preferably 0.8-5.0 weight-% sugar and/or other carbohydrate sweetening agent.

23. A tea based drink comprising 0.2-5.0 weight-%, preferably 0.3-4.0 weight-% plant sterol ester and 0.5-17 weight-%, preferably 1.3-12 weight-%, most preferably 2.0-8.0 weight-% sucrose.

24. A method for masking the taste of a bitter, sour and/or astringent edible product characterised in that from 0.2 to 25 weight-% plant sterol ester is added to the edible

product in any known way without separately preparing a coating on the bitter, sour and/or astringent components of the edible product.

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Abstract

The present invention relates to edible products with improved taste. The new products have improved sensory properties and they are healthier due to an added ingredient.